1. A spatially unrestricted force-feedback device, comprising:

a body;

gyroscopic means connected to the body to provide an inertial reference to stabilize the body

a in at least one spatial dimension;

a user-interactable member connected to the body; and

force-feedback means coupled to the member, enabling a user of the device to experience the

a feedback of forces relative to the gyroscopically stabilized body ~~base.~~ ;

2. The device of claim 1, wherein the user-interactable member is a joystick.

3. The device of claim 1, wherein the user-interactable member includes a handle.

4. The device of claim 1, wherein the user-interactable member is a steering wheel.

5. The device of claim 1, wherein the user-interactable member is a device associated with the simulation of a sport.

6. The device of claim 1, further including:

a computer system modeling a virtual environment including one or more virtual objects; and wherein

a the user-interactable member is in electrical communication with the computer system to generate forces on the member as a function of an activity involving an object within the virtual environment.

7. The device of claim 1, wherein the gyroscopic means includes a momentum wheel, and wherein a torque is produced on the member through accelerating and decelerating the angular velocity of the wheel.

8. The device of claim 7, including three momentum wheels to stabilize the body in three dimensions.

9. The device of claim 1, wherein the gyroscopic means takes the form of a reaction sphere operative to produce arbitrary reaction torques about three linearly independent axes of the body.

10. The device of claim 1, further including an angular position measuring device to determine the state of the body in space.

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11. The device of claim 10, wherein the angular position measuring device is a potentiometer.

12. The device of claim 10, wherein the angular position measuring device as an encoder.

13. The device of claim 1, further including an angular velocity measuring device to determine the state of the gyroscopic means.

14. The device of claim 13, wherein the angular velocity measuring device is a tachometer.

15. The device of claim 13, wherein the state of the gyroscopic means is determined by numerically differentiating the angular position of the body.

16. The device of claim 1, further including an active control system to provide device stability.

17. A spatially unrestricted force-feedback device, comprising:

a body;

an active control system to stabilize the body in space;

three rotatable reaction wheels coupled to the body;

means for determining the angular velocity of each wheel;

an angular position measuring device to determine the state of the body in the space;

a user-interactable member connected to the body; and

force-feedback means using the angular velocity and position of the body as inputs to produce torque on the member about three arbitrary axes through the coordinated acceleration and deceleration of the angular velocity of each wheel.

18. The device of claim 17, wherein the angular position measuring device is an inertial measuring unit.

19. The device of claim 17, wherein the angular velocity measuring device uses numerical differentiation to determine the angular position of the body.

20. A method of generating a spatially unrestricted haptic environment, comprising the steps of:

providing a body in space having a user-interactable force-feedback device;

geo-stabilizing the body in one or more dimensions;

simulating a virtual environment modeling one or more virtual objects; and

interfacing the user-interactable force-feedback device to the virtual environment, enabling the user to experience a force representative of an activity within the virtual environment involving one or more of the objects.

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21. The method of claim 20, further including the step of:

slowly and continually removing angular momentum from the body so as to minimize the effect on a user.

22. The method of claim 20, further including the steps of:

receiving an input disturbance on the body;

a stabilizing the ~~controller~~ body through a pole placement, with the location of the poles being determined through optimal control theory; and

canceling out the disturbance inputs to produce a desired torque output immune to the input disturbance.

23. The method of claim 20, further including the step of:

receiving an external force generated through a remote physical device; and

producing a scaled representation of the force received relative to a point on the physical device.

24. The method of claim 23, wherein the scaled representation is such that the maximum force applicable to the physical device is mapped into the maximum force that the device can produce.

25. A momentum sphere, comprising:

a housing defining three, fixed orthogonal axes;

a spherical object supported within the cavity, the object being capable of assuming any orientation relative to the cavity;

means for determining the orientation of the sphere relative to the fixed axes; and

means for providing controlled torques about the three axes so as to inertially stabilize the sphere in three dimensions.

26. The momentum sphere of claim 25, wherein the means for determining the orientation of the sphere relative to the fixed axes further includes:

a great circle band of reflective material affixed to the sphere;

a band of optical emitters within the housing to detect the relative position of the sphere through reflection from the circle band.

27. The momentum sphere of claim 26, wherein:

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the band of reflective material is broken up into discrete portions; and wherein:

emitter is positioned between detectors, thereby enabling a single emitter to service several detectors.

28. The momentum sphere of claim 25, wherein the housing is coupled to a user- interactable member to provide inertial stabilization with respect thereto.

29. The momentum sphere of claim 25, wherein the housing is coupled to a spacecraft to provide inertial stabilization with respect thereto.

30. The momentum sphere of claim ~~29~~, wherein the sphere has a maximum speed, and further including:

means for applying an external torque to reduce the angular momentum vector of the sphere as it approaches this maximum velocity.

31. The momentum sphere of claim 30, wherein the means for applying an external torque includes a reaction jet.

32. The momentum sphere of claim 30, wherein the means for applying an external torque includes a magnetic field torquer.

33. The momentum sphere of claim 30, wherein the means for applying an external torque includes means for reorienting the spacecraft such that the disturbance torque acts to cancel the sphere's angular momentum. if the disturbances to the spacecraft are primarily applied in the same direction and the spacecraft can continue to operate at different attitudes.